



## Short span UHPFRC railway bridge in Switzerland - from design to implementation

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## Abstract

This paper presents the design and construction of the Aiguillon railway bridge in Switzerland, one of the first railway bridges completely made of Ultra-High-Performance Fiber-Reinforced Cementitious Composite (UHPFRC). The length and width of the trough girder are respectively 6.6 m and 5.7 m. It is designed for a narrow-gauge track and two walkways. The trough is composed of two prefabricated elements in UHPFRC with steel reinforcement bars. These elements are first built in the plant and then are assembled on site by a longitudinal cast-in-place joint.

The challenges and the experiences in this project are discussed and analysed in view of future projects. Furthermore, the full-scale suitability tests to validate the joint between the two prefabricated elements are described. The test results of the structural resistance of the joints are in good agreement with analytical results.

**Keywords:** UHPFRC; railway bridge; prefabrication; lightweight structure; laboratory experiment

## 1 Introduction

The Aiguillon bridge is part of a local narrow gauge railway line in Switzerland. The structure has a single span of 6.10 m. The existing bridge, built in 1978, had to be replaced as it did not meet the normative requirements for operating a railway

line. The original masonry abutments, built when the railway line was created in 1893, were raised during the reconstruction of the existing bridge in 1978. The longitudinal slope of the existing structure is 4.4 %. The existing rails were directly fixed to the bridge deck without ballast and sleeper.